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SOIL CONSERVATION

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WOOD FOR WAR

BY A. E. FIVAZ

IN EVERY FIGHT on every front the products of American forests are performing tasks essential to an Allied victory.

From the 10 carloads of lumber required for the deck of a big battleship to the vital bit of nitro-cellulose in a Garand rifle cartridge, from the charcoal in a gas mask to the many billions of board feet of lumber required for boxing and crating equipment, food, and other material for our armed forces, from tanning extracts and walnut gunstocks to paper, fiber board, plastics, and rayon derived from wood pulp, from wooden barracks to lend-lease shipments, our tree crops in every form have gone to war.

On the home front, too, wood is a war worker. It contributes lumber for the construction of war plants and defense housing, stove lengths for fuel, timbers for mines and railroads, materials needed by farmers in producing food and fiber. Truly, wood is vital to our ability to "Pass the Ammunition!"

The supply of many forest products is inadequate to meet the demand for essential war uses alone, much less that for the normal civilian consumption. Take lumber, for example, which constitutes the biggest item of the forest crop. Before Pearl Harbor total 1942 requirements were estimated to be 33.8 billion board feet. Although we produced approximately 34.8 billion board feet of lumber in 1942, the demand for wood for war purposes increased our consumption to 40.3 billion feet. Imports, chiefly from Canada made up about 1.5 billion feet of the deficiency; the rest came from seriously depleted and unbalanced stocks on hand at the sawmills, factories, and lumber yards. This year's minimum requirements for all essential purposes have been estimated as around 31.5 billion feet after providing for a very sharp curtailment of less essential civilian consumption. In order to meet even this very conservative figure, the War Production Board has set a production goal of 32

EDITOR'S NOTE.—The author is Assistant Chief, Forestry Division, Soil Conservation Service, Washington, D. C.

Douglas fir piling harvested from a farm woods is ready to move into action—perhaps to strengthen a Pacific waterfront structure loaded with food and munitions for our fighting forces, or perhaps to help develop a beachhead on some distant shore.

billion feet. In the first three months of 1943 the lumber industry was not able quite to reach its first quarter quota, and is facing increasingly serious handicaps the rest of the year. Mill facilities are ample but manpower is critically curtailed.

Fuel wood, the second biggest part of the forest crop, likewise faces a rapidly increasing demand because of shortages in other fuels, and a rapidly declining production resulting from reduced labor. Failure to supply this year's estimated requirements of around 85 million cords will mean increased strain on supplies of other fuels and on transportation facilities, perhaps distress and illness next winter.

The relation of pulpwood production to essential requirements presents another critical picture. Recently the War Production Board stated:

Sawlogs delivered to the mill by the farmer who harvests them from his woodland will enable the lumber industry to speed fighting wood to war in the quantities needed.

Pulpwood in tremendously increasing quantities is required in making shipping containers, smokeless powder, shell cases, rayon, heavy-duty multi-walled sacks, photographic film and paper, medical supplies, plastics, map and blueprint papers and hundreds of special products for war uses. Over a million and a quarter tons of paperboard—2,250,000 cords of pulpwood—will be used in 1943 to package food, supplies, and munitions for overseas shipment.

It is now evident that wood-pulp requirements for 1943 will be considerably in excess of the probable supply of pulpwood. Therefore, it will be necessary to produce during the current year all of the pulpwood that can be cut in the various regions.

Certain forest products are listed by the War Production Board as critical materials, supplies of which are insufficient either for war demands alone or for war plus essential civilian demands. In addition to a large number of lumber items the list includes certain wood plastics and rayons, wood alcohol, charcoal, hardboard, and plywood.

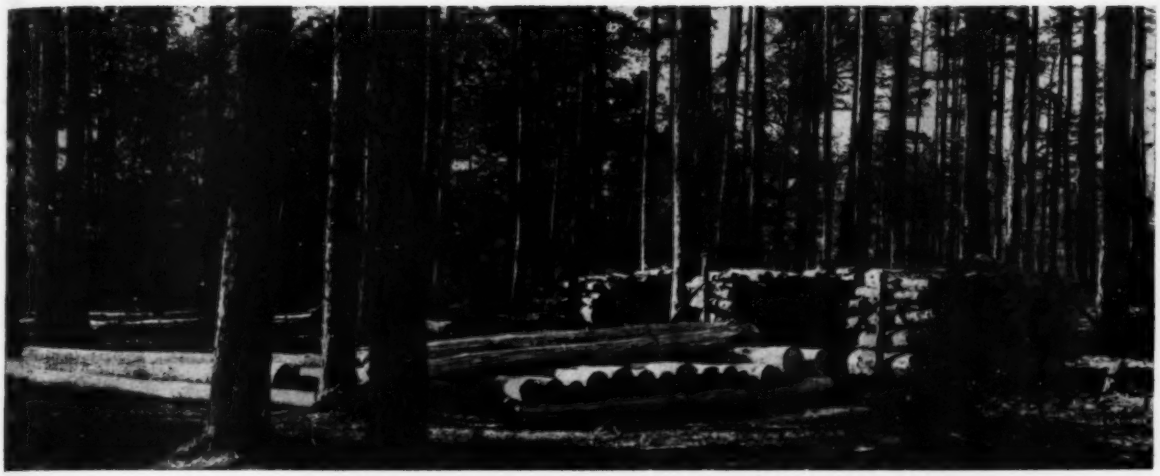
THE FARMER'S SHARE OF THE JOB

American forests are adequate in area, stand, and growth to supply through conservative cutting all of these essential wood requirements. This country has a total of 461,697,000 acres of commercial forests, of which 138,812,000 acres are part of our farms. The big job that must be done as a part of the war effort is to harvest, market, and manufacture the forest products that are so badly needed, despite the reduced manpower available. Since about a third of this Nation's annual forest crop comes from the farmwoods, American farmers have an important share of the responsibility of producing more wood for war, a more important share than many folks realize.

It is true that manpower is extremely short on farms, too, but after the crops are harvested the load of urgent work generally drops sharply and many farmers will have time to turn to the harvest of the forest crop.

CONSERVATIONAL CUTTING ONLY

A complete victory cannot be won at the cost of irreparable damage to our farm resources. Our



American forests are capable of meeting all our timber requirements this year—and every year—from conservative cutting that will leave every acre fully productive.

farmwoods are one of these vital resources. Fortunately, they can supply ample wood for war, without the devastation of a single acre. But the harvesting must be wise. It must single out the occasional ripe trees, the cripples, the "boarders," and leave the "producers" to make successive crops, crops for the war years, for the period of rehabilitation, and for steady future national development.

Some 3,000,000 farms include woodland classed as capable of producing commercial products. If the operators of each of these farms worked an average of 4 or 5 days harvesting and moving badly needed forest products to market, the supply would be fully adequate for all essential war requirements. Not all farmers will be able to do this, but others can do even better. Calling in a stumpage buyer will not be so much help as this, either to the country or to the farm income. The largest benefit accrues when the farmer markets his labor along with his crop. Present marketing opportunities are most favorable for improving profitably the growing condition of his woodland through selective cutting.

In many parts of the country, outstanding farmers already are participating actively in the production of more wood for war. They believe that if extra days of work in the farm woods will hasten victory ever so slightly those days will be well spent. They also recognize that careful harvesting of wood products improves the quality and growth of the woodlands. Reaping good profits now, they are also increasing their security for the years ahead. From soil conservation districts and farm forestry projects come reports of what these farmers are doing with a little help and guidance from the Soil Conservation Service.

FARMERS IN ACTION

Earl Lester, a farmer cooperating with the Davy Crockett-Trinity County Soil Conservation District in Texas completed a selective cutting of $740 worth of timber marked by a district technician on 40 acres of woodland. He hired neighboring farmers to help with the cutting and delivered the logs to the mill on his own truck. Mr. Lester said, "I got $20 per thousand for my pine logs delivered at the skidway because I had a few big trees that would fill a special mill order for some 22- and 24-foot construction timbers. I don't see any grounds for the common statement that farmers don't have the power or equipment to do their own cutting, skidding, and loading. I skidded and loaded logs up to 34 inches in diameter at the butt and 16 feet long, with a pair of mules that weighed less than 900 pounds apiece." He has a good stand of growing timber left on this woodland instead of the bushy waste that very likely would have remained had he accepted a $500 lump sum offer for all his merchantable timber.

Several farmers in California are going Mr. Lester one better. The Pajaro Valley Soil Conservation District is principally an apple producing section. The movement of this fruit to the consumer requires 3,000,000 apple boxes a year, and these cannot be supplied by the California box shook industry. George E. Tindall, a farmer in this district, was induced to start manufacturing 6,000 apple boxes and 2,000 grape lugs from second growth redwood on his farm. A neighbor, Mr. Cusack, is interested in supplementing the operation with more machinery and farm timber to produce nearly a million board feet of box shook. Incidentally, Mr.

Tindall is moving other products to the war market from his farm woods, including 100,000 feet of car stock, 40 cords of tanbark, and 162 cords of fuel wood.

Across the State of California, T. H. Brunius, a farmer cooperating with the El Dorado Farm Forestry Project, has just reorganized his veneer plant to manufacture standard Los Angeles lugs (fruit boxes). He will harvest timber from his own farm and from that of another farm forestry cooperator, and expects to manufacture box shook for 300,000 lugs from selective cuts in this Ponderosa pine timber.

Not only do California farmers produce food for freedom, but also they produce the containers needed to make delivery of that food possible. Fifteen other farmers on the El Dorado project, through conservative cutting of their farm woods, are supplying about 6,000,000 board-feet of Ponderosa pine lumber for the manufacture of ammunition boxes.

Farmers near the Piedmont Land Utilization Project, Eatonton, Ga., are profitably marketing their labor between crop seasons and helping meet the war demand for wood by undertaking the harvest of forest products from lands administered by the Soil Conservation Service. Over a hundred farmers have bought stumpage and are marketing badly needed logs, pulpwood, ties, fuelwood and other products from these government lands. Farmers are doing likewise in the vicinity of land utilization projects in other States, including Florida, Mississippi, North Carolina, Kentucky, Oklahoma, Delaware, and Pennsylvania. On projects where the amount of ripe timber is more than can be handled by local farmers, the Soil Conservation Service is selling the excess to commercial operators.

Even in the Prairie States, not generally associated with production of forest crops, local timber is being selectively harvested. The Labette County, Kans., Soil Conservation District has obtained the loan of two trucks and trailers to move logs to the mills. As a result, three local sawmills will operate most of the year instead of their ordinary season of two or three months. The mill men like the idea of selective cutting. They are getting larger logs and better quality of lumber, and sawing more volume with less man-days of labor.

The farm forester at Parsons, Kans., has persuaded a local farmer elevator cooperative to go into the business of finishing local lumber so that farmers in this "lumber-drought" area may obtain materials essential to their food production job.

At Garnett, Kans., there is a small plant manufacturing egg crates, which was held down to 3 days' operation a week because of the difficulty of securing shipments of cottonwood from the South. Farmers in soil conservation districts within 25 miles of this plant have sufficient ripe cottonwood timber to more than double the essential production of crates, and supply local rough lumber needs as well. Soil Conservation Service personnel assigned to these districts are bringing the supply and the demand together.

At Ten Sleep, Wyo., and at Chadron, Nebr., soil conservation districts have set up small cooperatives for treating locally produced fence posts. Farmers and ranchers were having difficulty getting enough posts from normal sources. Farmers in the Turtle Mountains near Bottineau, N. Dak., organized a cooperative marketing association under the guidance of the local farm forester, to handle fence posts and fuelwood.

Nebraska farmers are supplying quantities of black walnut timber for gunstocks from trees appraised as to value and recommended for cutting by technicians assigned to soil conservation districts or to the farm forestry project. Not only are they receiving full value for the trees sold, but their smaller trees are being saved for future crops.

In Wisconsin, a very effective procedure is bringing together the farmer who has merchantable timber, the small mill man, and the prime contractors. Interested State and Federal agencies have established a State Timber Marketing Committee to serve as a clearing house for information on needs and supplies. A bulletin is issued and distributed periodically to farmers, mills, and contractors.

Here is how the bulletin works: A farmer living near Wausau, has 15 acres of woodland from which he wants to sell as stumpage a selective cut of white pine. He looks through the bulletin for a nearby buyer of pine stumpage and closes a satisfactory deal. The pine is logged and cut to the specifications of a box company listed in another part of the bulletin. The box company had stated in the bulletin: "Products manufactured—ammunition boxes. Use—armed forces. Present supply insufficient, need urgent!"

H. A. Gillette of Columbia, Conn., is an aircraft worker who also does some part-time farming. With the help of a farm forester Mr. Gillette has marketed from the 30 acres of woodland on his farm a cut of hardwood logs of ship timber and railroad tie sizes. Aircraft parts he helped manufacture may even now be speeding to the fighting fronts by rail and ship—ships which he helped to build.

Three farmers in the farm forestry project near Washington, N. J., had small amounts of merchantable timber, amounts generally sold only to small mills at very low prices for uses that can be ade-

quately filled by low-quality logs of inferior species. These three farmers arranged through the farm forester to pool their prospective wood crops in a single offer, which was made to 34 timber buyers. A very attractive bid was accepted and the trees are headed for the shipyards, in the long lengths required for PT boats and subchasers.

In the farm forestry project in Adams County, Pa., farmers are sending their wood to war, sawlogs to mills manufacturing high priority furniture and the tops and poorer trees as pulpwood to the paper plants. Even the bark of the trees is made to serve, that of chestnut oak going to leather tanning plants.

New England is noted for many things, including its conservatism, shipyards, and patriotism. The last is a blending agent in the case of farmers near Pleasant Valley, Conn., who have been cherishing groves of stately oaks on their farms for generations. They are marketing a crop of the largest of these oaks, carefully selected by the farm forester, for the huge timbers, and the knees for fighting ships, food cargo vessels, and other war construction.

Fighting farm timber is also moving to market in Maryland. On the farm forestry project near Jarrettsville, yellow poplar reaches large size, and high-grade yellow poplar logs are badly needed for aircraft veneers. George K. Gettings sold 70 of these picked trees, and the woodland on a fine old estate near Towson, Md., owned by Mrs. William C. Stettinius is yielding many magnificent yellow poplars from 26 to 42 inches in diameter. The farm forester reports that the first 66 trees marked for cutting contained 44,000 board feet of veneer stock.

It is a long jump from Maryland to the Pacific Northwest, but there, too, fighting trees are coming out of farm woodlands. The urgent demand for long Douglas fir piling found the Washington Forest Products Cooperative Association prepared. Organized in May 1940 by 45 farmers in the vicinity of the Snohomish CCC camp operated by the Soil Conservation Service, this first forest products cooperative west of the Mississippi is serving as a vital connecting link between the farm woods in the Snohomish Soil Conservation District and the war markets. Twenty members marketed $40,000 worth of farm-woods products through this association last year, and most of the harvest was of critical war materials. Douglas fir piling 90 to 135 feet long is one of these. Sawlogs, poles, and fuel wood were also important products.

In the Otero Soil Conservation District in New Mexico, cooperator Fred Griffin has marketed over a quarter of a million board feet of mature and over-

This fruit grower is making sure that the apple crop will be safely packed for shipment. He is himself converting selected trees from his farmwoods into box shook.

mature pine and fir trees from his farm woods. All the lumber and smaller timber being produced is going to serve in the potash mines at Carlsbad, N. M. The slabs and sawdust are substituting for coal for civilian use in the town of Artesia. Even the slash is being used, this to help control erosion on adjacent cultivated land producing war crops.

In West Virginia trees killed years ago by an Asiatic blight are returning as ghosts to fight a new Asiatic menace. Dead chestnut by the carload is moving to tannin extracting plants from farms on the Ronceverte farm forestry project, perhaps to fit shoe leather for the marches on Tokyo and Berlin.

The pine and hardwood lumber industries in the 12 Southern States are facing the greatest problems in trying to meet their large share of the national lumber production goal. At the request of the WPB and the war committees of the industries, the Soil Conservation Service is giving special emphasis to the farm woods-harvesting phase of its wartime program. On every farm forestry project and in the hundreds of soil conservation districts throughout the South, more farmers are being encouraged and helped to harvest and market wood for war. Here, as with food, the keynote is more production through conservation. Applied to the farm woods, this means selective cutting for sustained yield, and complete utilization of all trees cut. A good illustration is the woods harvest made by J. L. Nave, a farmer on the Oklahoma farm forestry project near Broken Bow. Marked trees from his 69 acres of upland pine and hardwoods yielded 53,000 board feet of sawlogs; from the tops of the sawlog trees, 131 railroad ties were sold, and further top utilization produced 16 cords of fuel wood. This elimination of waste added many dollars to the profit realized by Mr. Nave from his wood crop.

Many southern farmers are learning from expe-

rience that by making periodical cuttings of pulpwood on their piney woods they can increase the growth of sawlogs while making substantial monetary profits from the pulpwood harvests. Farm forestry cooperator M. A. Thigpen, Franklinton, La., is harvesting 250 cords of pulpwood, and actually improving growing conditions for the sawlog trees on part of his 200 acres of farmwoods. A neighbor, S. E. Magee, was reserving the timber on 125 acres of farmwoods to put his 12-year-old son through college. He saw the wisdom of improving his woods growth by cutting 300 to 400 cords of pulpwood and over 150,000 board feet of old pine and gum. As a result, his son's education will be further assured by a better woods, plus approximately $2,000 in War bonds from the profits of the thinning and discriminative cutting. The local pulpwood contractor, Frank Richardson, asked to have his woodland marked for a pulpwood thinning. The farm forester reports that this timber was being reserved, and would not otherwise be available for war use. Another farmer who does not need the income is considering the sale of a million feet of sawlogs, only because the farm forester recommended it to meet the war need, and will assure that good forestry practices are observed.

With the help of a neighbor, P. A. Griffon of Spearsville, La., removed 91 cords of pulpwood in thinning 23 acres of dense pine woods to speed up its growth, cashing in nearly $160 for the stumpage and profit, and over $130 for the labor. This piece of woodland will be ready for another thinning 5 years hence. In these thinnings, the main crop of trees is given more room to grow, the profits coming entirely from superfluous trees that would otherwise die and rot away. These examples of farmers helping win the war by woodland conservation, which means wise use, are being repeated in many districts and projects in all the Southern States.

This report of the war job of farmers in their farm woods would be entirely inadequate without reference to the fight against forest fire. Last year, 200,000 fires—500 for each day in the year—destroyed timber of sufficient volume to build 20,000 Liberty ships, or 2,000,000 army truck bodies. As expressed by the American Forestry Association, the wood that is thus being destroyed is desperately needed to keep our war plants operating at full capacity, and to keep our fighting men supplied with food, arms, and equipment. American farmers must help reduce this tremendous leak. Every fire that burns the farm forests is a threat of defeat. Many farmers are already doing something about this enemy in our homeland. The governing bodies of all the soil conservation districts in southeastern Minnesota have organized to prevent and control forest and farm woods fires through education and the addition of fire-fighting equipment. In the Richland Creek Soil Conservation District in Kentucky, 70 percent of the farmers are enrolled in the district-sponsored fire-control association. Other districts in other States are following suit, and farmers individually are taking increased precaution to prevent fires and promptly control those that do start.

LATEST PROGRESS REPORT

In May the employees of the Soil Conservation Service, Washington and the field, invested nearly $200,000 in War Savings bonds under the pay-roll savings plan. This was a gain of more than 46 percent over the investments made during the month of January.

Since the first of the year, the Service's field offices have increased their standing among the 22 bureau field offices from twelfth place to third place in the percent of pay roll allotted and the Washington office of the Service has moved up to seventh place from twenty-sixth place among the 29 major bureau offices in Washington.

Our Government expects us, who are in its civilian service, to show the way in buying war bonds by participation in the pay roll savings plan. The outstanding record of the employees of the Soil Conservation Service has shown that we have accepted this challenge. The most we can invest in democracy is the least we can do.

The employees of the land acquisition division, Washington, were personally commended in a letter from the chief for having the highest record of all offices of the Service for the purchase of War Savings bonds under the pay roll savings plan for the month of May.

—John S. Fickling.

SOUTHEAST ENLISTS HALF-MILLION IDLE ACRES IN WAR EFFORT

A total of 520,000 acres of formerly idle land in the Southeastern Region has been put to productive use on 50,000 farms for which complete conservation plans had been developed as of December 31, 1942. Nearly 150,000 acres have been planted to perennial hay crops, principally kudzu and sericea lespedeza, and will provide feed for production of milk and meat needed in the war effort, Regional Conservator T. S. Buie of the Soil Conservation Service points out.

More than 140,000 acres have been brought back into cultivation and are being protected against erosion by the use of terraces, contour tillage, strip cropping, and improved rotations. Some 116,000 acres are being developed for improved pasture, nearly 90,000 acres have been converted to woodland, and the remaining 24,000 acres are being devoted to wildlife, orchards, vineyards, and miscellaneous uses.

The 520,000 acres of formerly idle land represented 6.2 percent of the land in farms, or an average of 10.4 acres per farm, which has been enlisted in the war effort through sound land use. In addition, increased yields are being obtained through conservation farming practices which have been established on all of the 8,400,000 acres comprised in the 50,000 farms covered by conservation plans.

Pipe line water in the largest soil-conservation district is making it possible for vital beef herds like this one of Heckethorn's to increase and fatten to help whip the Axis.

IT'S THE WATER THAT COUNTS

By Kenneth E. Bradshaw,[1] Cale C. Johnson,[2] and Frank B. Harper [3]

IN NEVADA, with the smallest capital in the United States and some of the biggest sheep and cattle ranches out-of-doors, it truly is the water that counts—water that for the most part flows down out of the winter's snow which caps the seemingly endless succession of mountain ridges, into the high valleys between. The snow water literally laughs at the scant 4 to 8 inches of annual rainfall, because it, rather than the rainfall, is the factor which makes or breaks the bulk of the crops.

TODAY, Nevada ranchers, especially in soil conservation districts, are making that water count for the all-important purpose of helping to win a war. It is in substance the working out of a quite simple equation: Water makes pasture and hay grow; this feed produces many cattle and sheep; the latter provide meat and animal fiber and leather. These end products contribute importantly to feeding and clothing America's fighting men and women, war plant workers and lend-lease Allies.

If you would like to see soft, crystal-clear waters coming out of mountains, which tower to 13,000 feet in elevation, down into 6,000- or 7,000-foot-high valleys, visit White Pine County, in east-central Nevada along the Utah line.

This is the location of the largest soil conservation district in the United States, or anywhere else, for that matter—5,628,800 acres covering the entire county. Of this staggering acreage, only part is privately owned, the rest being public lands administered by the Forest Service, Grazing Service, and Indian Service.

Ely, near the center of this typically western block of country, is the county seat. If Chairman Arthur Carter of the White Pine Soil Conservation District is too busy on his own ranch to play host to you, District Conservationist Cale C. Johnson of the Soil Conservation Service can be persuaded to take you to North Spring Valley, where you can see some good examples of what water developments are doing for the war effort.

Since long before the Indians ground their grain and other native seeds in crude stone mortars and pestles (primitive implements still to be found in these Nevada valleys), water has flowed abundantly out of the steep canyons that dissect the high moun-

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[3] Division of Information, Pacific Coast Region, Portland, Oreg.

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tain range on the western edge of this valley. It has plunged down the steep foothill slopes, rolling rock and gravel before it to build up broad alluvial fans, and finally wasted itself in the alkali sinks and marshes of the flat, landlocked valley below.

Then came the white man and his herds and flocks, and the gradual, generations-long development of the present characteristic western livestock set-up. Valley headquarters were established where supplemental winter feed could be grown on fertile bottomlands cleared of big sagebrush and rubber rabbitbrush and greasewood, and watered by mountain water. Water holes dotting the public lands provided coveted bases from which cattle and sheep could range in the piñon and juniper covered mountains, and over the desert lands below.

Unfortunately, though, less than half of the precious mountain snow water ever found its way to the roots of pasture and hay crops. The streams had built their own traps in the form of the huge alluvial fans, into whose porous, gravelly interiors most of the precious water sank. Upland ranges were depleted through the years of constant grazing; and, in the end, there was a clear need for better and more economical use of the vital water resource, even before Pearl Harbor made the individual rancher's need one of common national necessity.

The first of what will be a long list of pipe-line developments to corral this wild mountain water and multiply its usefulness in wartime and peace, was installed on Mrs. Marion Yelland's ranch in this valley in the spring of 1941. As the White Pine Soil Conservation District did not get under way until the summer of 1942, this water facility was made possible through a State Extension Service—Soil Conservation Service demonstration plan, now expanded into a district plan.

If Mrs. Yelland is not home, drive down and talk to one of her four sons, who will probably be found busy marking off for irrigation the latest field of good valley land they have cleared. Such clearing precedes what will probably be an 8-year soil-conserving rotation—2 years of small grains and row crops, such as potatoes or corn, followed by 6 years of alfalfa hay. Any one of them (Kent, Bill, Lou or Henry) can tell you about the 10-inch concrete pipe line, more than a mile long and 30 inches underground, that will carry in a steady flow, without loss in the alluvial fan, up to 5 second-feet of water from turbulent Taft Creek. The pipe line is supplied from a masonry dam across the creek via a 110-foot rubble masonry ditch with safety overflow spillways. It empties into a masonry velocity-reducing outlet ditch 50 feet long, and a diversion box that turns the water into the distribution ditch.

The season-long dependability of the new irrigation stream makes possible the increased production of vital feed on between 400 and 500 acres of their 1,300-acre ranch. Before 1941, 90 acres of that land was in native desert brush; and any amount of labor and coaxing could not keep the water flowing over its thirsty, gravelly bed throughout August and September when it was needed badly on some 335 acres of native meadow hay and pasture. The Yellands report, however, that since installation of the pipe line, for the first time in the half century history of the ranch, there has been irrigation water available in mid-September.

Kent, for example, will tell you:

"In 1941, before the pipe line had been in long enough to do us much good, we cut 27 stacks of hay, averaging 10 tons to the stack. Last year, 1942, we cut 37 stacks, or better than one-third more! As dry as it was last summer, we would have cut only 15 or 20 stacks at the most without this water."

He refers to the cutting of their native meadow which has been reseeded to clover and grass and fertilized with corral manure. Both of these practices, incidentally, are basic in the White Pine District program.

Despite depredations of jackrabbits and blackbirds last year, the Yellands likewise harvested around 8 tons of grain, a decided increase over the 5 tons produced the year before. This was on a piece up at the "home place" watered directly out of the pipe line. There were Food for Freedom potatoes, too, and other new crops made possible by the water.

Now as to the next element in the Yellands' water-feed-livestock equation: In the spring of 1935, they were down to only 52 head of good grade range Herefords. At the last count, in the fall of 1942, they had 330 head, including calves. In addition, they run a band of about 1,200 ewes.

"With this water," Kent adds, "we are cleaning off the brush land for alfalfa as fast as we can, with close to 60 acres already broken out. We probably can get 200 acres altogether. With that much extra land producing feed, I'd say we could run 600 head of cattle, or maybe more. We figure on getting most of it in within two more years. We never could have done anything without the pipe line water."

They have not bought a single cow, but expanded by natural herd increase; and they keep up herd quality and boost their wartime marketings by selling off the old cows and culls with the regular beef stuff.

Speaking financially, is the pipe line worth what it cost the Yellands?

"We've already got our money's worth," quoting Kent once more. "Why, we sold 100 tons of last

The old channel of McCoy Creek. Formerly, this gravelly alluvial fan drank up nearly all the water by late summer, when it was needed most for bottomland hay and other crops.

Mountain water on its way to the valley to irrigate war feed crops in Nevada's big White Pine Soil Conservation District. Mr. Heckethorn (left) and Cale C. Johnson, district conservationist, check up on the pipe line intake structure.

The pipe lines are contributing to efficiency and comfort around ranch headquarters, too. Electricity is generated by a small turbine installed in the Heckethorn pipe line for lighting, feed grinding, and other uses.

year's extra hay for $15 a ton, and right there repaid much of the cost of the whole thing. And don't forget, we'll be able now to go way over our beef marketing war quotas!"

Adjoining the Yelland ranch on the north, and reaping benefits from a similar pipe line development, is Will S. Heckethorn's 1,960-acre place. Here, a 12-inch metal pipe line was installed in the spring of 1942. Carrying from 6 to 9 cubic feet of water per second from McCoy Creek across some 6,200 feet of porous alluvial fan, it aids in the irrigation of 900 acres of old hay and pasture land, and about 30 acres of newly broken land. An additional 80 or 90 acres are planned for clearing and cultivating.

Heckethorn previously managed to irrigate a comparatively small acreage in the spring and part of the summer, by keeping a man busy with team and fresno trying to hold the water in a delivery channel downslope to his bottomland. But, because of the improved water supply, in 1942 he topped his previous maximum production by 300 tons of hay. He explained this large increase by saying:

"Before getting the pipe-line water, I have seen the hay get up 8 to 10 inches high and then burn right down, because there wasn't water to keep it coming. Why, the sickle wouldn't even cut it. But now, having late water, we can keep it coming until cutting time. That's what makes the difference between a good, big crop and a poor one—or no crop."

The additional feed is being used to increase the pre-pipe-line herd of 600 head of cattle to 900 or 1,000. Despite increasing the herd, Heckethorn still has between 150 and 200 tons of hay left over from last year. He wants to keep a good supply on hand as "insurance" against a bad winter; therefore, he does not sell off all the extra hay he produces.

Aside from holding over reserve feed, Heckethorn carries out other good management practices. To balance the increased feed production and make a more stable unit, he has purchased a large share of a 50 square mile private summer range. He owns approximately 25 purebred bulls, too, which are steadily increasing the quantity and quality of beef sent off to market.

When asked about the value of increased aftermath grazing on his fields, Heckethorn was enthusiastic.

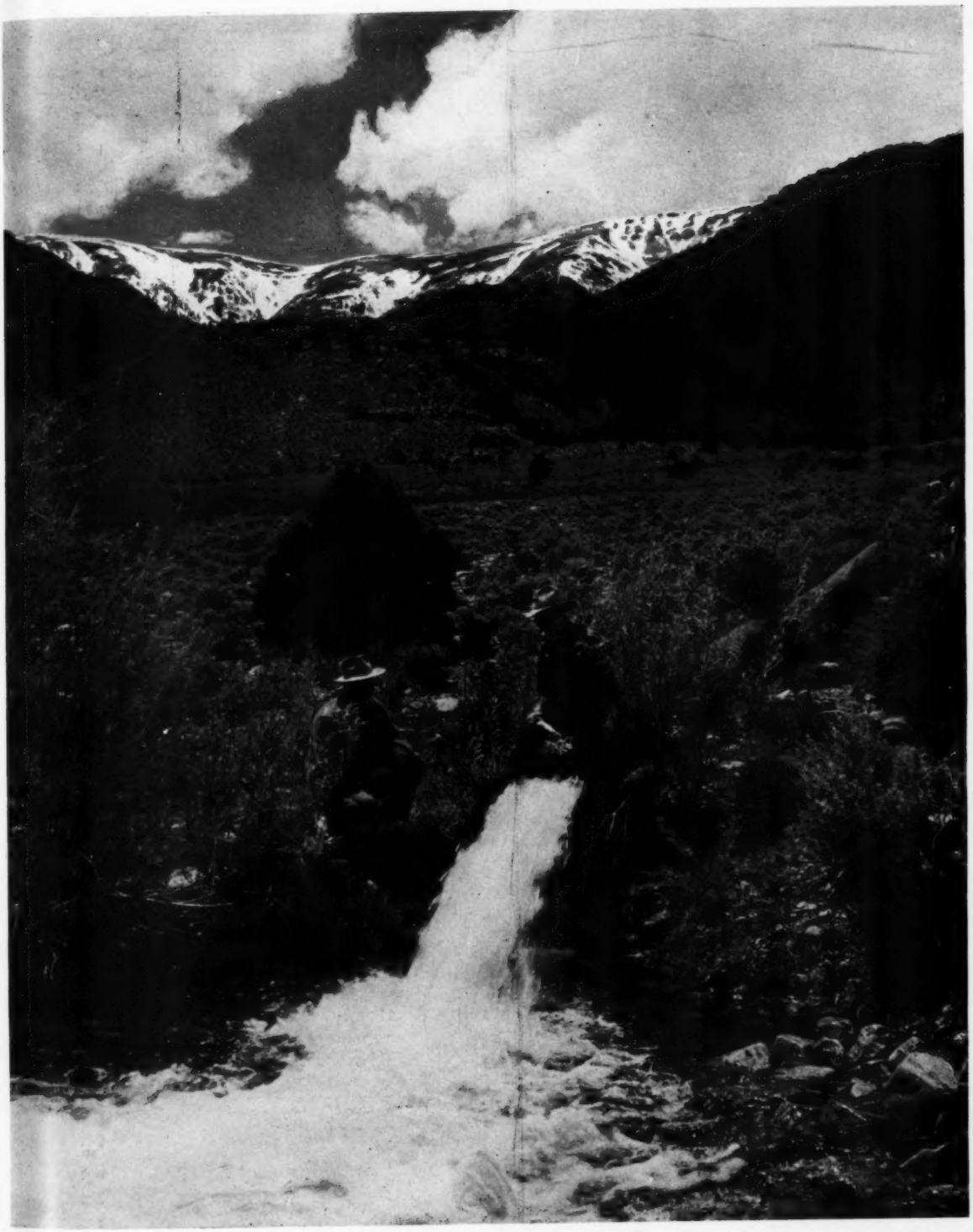
"I can't give you any figures; but, gosh, it makes an awful lot of difference," he replied. "We water the meadows after the hay is cut off, and it grows back faster than the cattle can eat it.

"Beside that, we are able to put water out on pasture land that never could be irrigated before, and practically the whole thing is wetted down now. By sowing grasses, it makes a lot of good pasture; and we're trying to get every inch of it into something, either hay or pasture. It's the water that makes the feed—everybody knows that!"

A unique feature of the Heckethorn pipe line is a turbine generator installed at the outlet. The electricity furnishes domestic lighting, and will save labor and food by running shop machinery, feed crackers and choppers, and a freezing unit.

To see a third example of pipe-line production, drop in at the 1,960-acre ranch operated by "Pete" Johansen, with the same problems as his neighbors in North Spring Valley. Heretofore, the amount of water reaching the valley from Bastian Creek would irrigate only 35 or 40 acres. A 2,600-foot, 12-inch metal pipe line leading into a small holding reservoir was completed in the spring of 1943, and now supplies water at the rate of as much as 6 cubic feet a second to approximately 450 acres of virgin land.

Johansen already has cleared and leveled 20 to 25 acres, and started his improved farming layout off on a purposeful wartime basis by putting in 5 acres of potatoes and a small acreage of dry beans, in addition to the feed grain that precedes alfalfa seeding on new land. This outfit runs 3,500 sheep and 75 head of cattle. Johansen figures on stepping up the cattle herd as he brings more bottomland into alfalfa production and brings up his hay and pasture yields on 700 acres or so of native meadow-



A 12-inch metal pipe line more than a mile long now carries the water across the thirsty stretch, and delivers it to the irrigation system.

New land coming into production. Heckethorn's dependable water supply means more hay, more cattle—more beef and leather—for the warbasket.

land. He already has started brushing off and fencing part of this preparatory to improving it further through grass seeding.

"We have plenty of land and will keep clearing it off until we reach the limit of our water supply," he explained between giving directions to one of his men for hurrying up preparation of the potato land for planting. "The pipe line and reservoir have way more than doubled the land we can handle.

"We have been getting 60 to 75 tons of hay a year, but I can use 100 tons right here and not have to go out and haul any. With this pipe-line set-up, I know we'll get a couple of hundred tons. I also am counting on alfalfa for seed, for I think we can raise all kinds of it."

Recalling the waste of water formerly experienced on this ranch, Johansen was of the opinion that the pipe-line cost would pay its way out in a reasonable length of time, to say nothing of increasing production in the meantime.

So runs the story of how pipe lines boost production for Victory in Nevada's big White Pine Soil Conservation District. It has been said that water is "the lifeblood of the West." Ranchers in the United States' largest soil conservation district are showing a way of developing that water to help "win the war and write the peace."

SAVING SOIL FOR SOLDIERS

BY P. K. HOOKER

NOT LONG AGO, Ernie Pyle, world-traveling columnist, told in one of his columns how a remark he had made in an earlier column had prompted a reader to send him a small packet of United States soil. Ernie's soldier friends gathered 'round and appeased their desire to tread again on the soil of their homeland by rubbing their bare feet in that little packet of the soil so precious to them.

It reminds me of an interesting news item attached to the 1942 Annual Report of the Board of Supervisors of the Vernon County, Wis., Soil Conservation District.

Just recently a Vernon County farm youth, Carlyle Skolas, home on Christmas furlough, stopped at the Vernon County Soil Conservation District office and asked that his soil-conservation plan be placed in practice on his farm. "I won't be home again for possibly a couple of years, and when I return I want to see our plan in practice on the farm. Help my dad and see that all soil-conservation measures are put in practice on the farm," said this young man. Many other farm boys have the same attitude. These boys are fighting to preserve your freedom. Parents, arm yourselves to defend your and their farms. This is a challenge—can you accept it?

A county soil-conservation district was formed by your county board because it felt the need for soil-conservation measures in the county. The district staff will gladly assist you in building defenses against soil and water losses on your farms.

Your boys will be returning at the end of the war to operate these "home farms." Let's hope they need not ask the question—"Well dad, here's the farm, but where's the soil?"

With the soil of our great country meaning as much to the boys in our armed forces as these two incidents indicate, it is the duty of all of us at home to do our utmost to preserve it for them when they return, at least for those who do return.

A DAUGHTER WRITES ABOUT HER DAD

Next month, a girl named Gwen tells our readers what soil conservation has meant to a 300-acre dry farm in Whites Valley. Her father is a member of the board of supervisors of the Northern Utah Soil Conservation District. Gwen calls her article, "Dad Preaches Conservation."

PLOWLESS FARMING

BY ARNOLD G. INGHAM

DURING THE LAST 12 years we have worn out only one plowpoint. Most of that wear was in the three gardens and in some contour plowing in the pastures. Since giving up "farming" we have cut our overhead expenses over 50 percent and have eliminated all the gullies and galls that had earned for our place the reputation of being the poorest farm in the county. It is years since we have bought any hay. Our purchases of high protein feeds have been cut in half. Our cattle are bigger, and they produce 40 percent more milk with 40 percent less labor.

When we put our best land in corn every year we had that much less land in pasture. As a result, we had to buy more high-protein feed to balance the low-protein corn. We also had to feed hay in the summer because we were short of pasture, with the result that we ran short of hay in the winter, and had to buy hay to feed our cattle until our poor pastures could help out. What lime we could afford to buy went on the hayfield, and most of the manure and fertilizer went on the cornland. We plowed on the contour, hauled every bit of manure out daily direct to the fields, and bedded everything heavily with litter from the woods—wonderful crops of corn and alfalfa ensued, but the net profits were very small. It was all we could do to meet the modest payments due to the Federal Land Bank, and other creditors had their patience severely tested.

We struggled along until the record-breaking drought of 1930, which left us in the red to the tune of over $1,600. The Federal Land Bank was worried, too, but let us hang on. We bought hay and feed and carried all our labor and their families through that winter, and came into 1931 with great hopes.

We got 25 acres ready for corn that year. One thing about a real dry year is the fact that plant food is conserved because there is not enough rain to wash it away as fast as it becomes available. This is why irrigated land in arid countries gives such wonderful results. This was the effect that we got in 1931. Everything started off beautifully. The corn grew nicely, and the grains and weeds in the corn also grew—plenty of crabgrass seeds had not sprouted the year before. This made us give that corn extra working. It seemed, however, that every time we cultivated the corn we got a heavy rain right afterward. This made the corn grow

This fire lane was cut through woodland and seeded to pasture grasses by Mr. Ingham. Grazing serves to maintain the lane as an effective fire-break.

nicely, but the sad part of it was that a lot of topsoil washed away at the same time. After the corn was put into the silo (and a man from Iowa who helped put it in said he never saw more good corn go into a silo), we took a good look at the field. It was a mass of gullies 2 to 10 inches deep. It did not require an expert to figure that more plant food was washed away than had been taken up by the corn crop. The value of the lost topsoil was beyond calculation. It takes nature 400 years to make 1 inch of topsoil, and ours had been washing away for over a hundred years, so, although we had made a good crop and had eased the Land Bank situation, we figured we had done it by overdrawing on the Bank of Fertility. The working capital of that bank was provided by the Founder, and is the chief wealth of the State. The farmer is really only a trustee; he has no right to rob the bank and abscond, as he has been doing for generations. The result is the great rural slums we see from the Potomac to the Okmulgee.

We figured that if that land had been in a good stand of grass there would have been little or no soil erosion. Our cows could have cut the crop and got just as many units of digestible nutrients from it, while returning most of the plant food. So we got seed catalogs and bulletins and bought and planted a lot of pasture grass and clover seeds.

The result was nothing to brag about. The herdsgrass did very well but the orchard grass, bluegrass, and clovers failed to produce results as promised. We had to buy more hay than ever, as our alfalfa was playing out.

Then came J. C. McGuire, an apostle of Korean lespedeza. This was to be the salvation of the poor

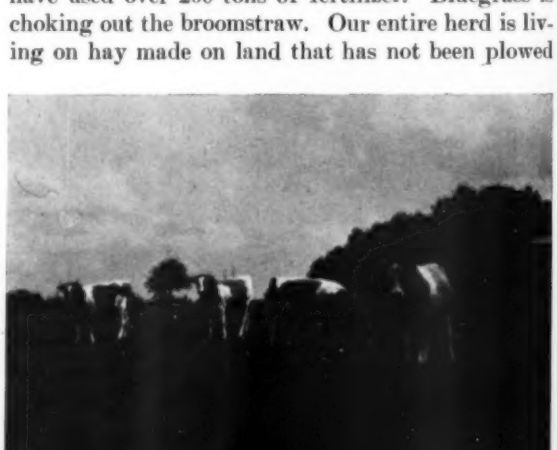
Contrast between treated and untreated pasture similar to conditions found on the Ingham farm. An excellent stand of orchard grass, white Dutch clover (ladino clover in low, moist spots), lespedeza, and red top (herd's-grass) is coming in.

man on poor land. This was the crop which would grow on poor, worn-out land, which needed no lime or fertilizer, which made good hay and grazing, and which reseeded itself. We tried it and it turned out just like McGuire said. All we had to do was to sow Korean lespedeza anywhere and we got all the hay and grazing we wanted, as long as the lespedeza was growing. It did not get started until June and it quit at the first frost but it really gave results and saved us from buying hay any more and let us sell our corn planter and cultivator. The "relief men" came and hired our help, and our team stayed in the pasture all the time it used to work in the fields.

In a few years broomstraw choked out most of our lespedeza. We had to get to work and mow broomstraw so as to give "deza" a fighting chance. It was no go. Mowing gave good results but did not seem to worry broomstraw to death. We knew that the old trick of burning off the broomstraw was suicide and would kill what grass we did have and only make the broomstraw more of a pest. Then we heard Dr. "Tom" Hutchenson talk on pasture fertilization and also give "deza" a lot of debunking. It seemed that Korean lespedeza could not really do all those things that it appeared to do. It really was a scavenger crop and lived off what other crops could not exist on and when its meagre diet was used up it died out and really left us worse off than ever. What we had to do, according to Dr. Hutchenson, was to feed our land the elements of plant food that it lacked to make real pasture grass and alfalfa grow. Bonanza farming was not permanent agriculture, whether we took away plant food with corn and alfalfa or cleaned up the scraps with lespedeza. But that broomstraw had us licked. Then we heard a man ask Dave Painter at a meeting how we could grow grass in Eastern Virginia when the broomstraw always choked it out in about 2 years. "Broomstraw never choked out any grass," said Mr. Painter. "What happened was that the grass used up all the available plant food and then died. Then, thank Heaven, broomstraw came up and held your land together." That was a revolutionary idea and certainly sounded just as amazing as what Mr. McGuire had claimed about lespedeza.

This farming game is deep. Did we have to keep on feeding the land forever to make grass and alfalfa grow? Had our predecessors robbed the Bank of Fertility and left us with the job of putting up new capital? There was no more virgin land out West. Our topsoil had gone down the river but we could not go over the mountain as our forefathers used to do. The Western man's land was blowing away in duststorms—we could not look to him for our hay and grain as in former days. We definitely were not going back to corn. Our land was not washing away any more. We heard of people who had gone in for pasture fertilization and had cut down the cost of producing milk and raising cattle. Figures from the Department of Agriculture showed that the average dairy farmer spent 50 times as much for feed as he did for lime and fertilizer, but that the most successful dairy farmers spent nearly half as much for fertilizer as they did for feed. They also showed that cows on grass produced better and cheaper milk than cows fed in a barn. They also showed that young cattle raised on good pasture grew bigger and healthier and much cheaper than young cattle raised on hay and grain.

In the last 7 years we have used over 1,000 tons of limestone on 140 acres of grass and hayland. We have used over 200 tons of fertilizer. Bluegrass is choking out the broomstraw. Our entire herd is living on hay made on land that has not been plowed



Registered Guernseys feeding on a pasture of the Ingham farm—orchard grass, lespedeza, red top, bluegrass, white clover, and red clover. Well developed pasturage, rich in protein, is provided the year round.

for many years. We have the best alfalfa we ever had on land prepared with a disc harrow. We have excellent hay growing on land that has not been plowed for 82 years! We paid off the Federal Land Bank 10 years ahead of time! Last year we put 20 percent of our income into United States war bonds. The old Bank of Fertility is paying dividends and accumulating a surplus.

EDITOR'S NOTE.—The author of the foregoing is a cooperator in the Piedmont Soil Conservation District. He gets his mail at Wellville, Va. He is a topnotch farmer, with a topnotch farmer's contempt for slovenly farm ways. He also is an effective evangel of soil conservation, and a prime teller of stories—usually Scotch.

Mr. Ingham's article, Plowless Farming, which you have just read, was written at the behest of Linwood R. Henderson, of the Soil Conservation Service. Specially wanted, to quote Ingham, was "something from a farmer right off the pitchfork."

That "something" turned out to be this homely-phrased gem logging Mr. Ingham's dramatic progress from tragedy to triumph. It roused instant enthusiasm and, likewise, instant curiosity as to the practical details encountered along the way.

In a few offhand notes jotted down by way of postscript, Mr. Ingham has supplied a number of interesting commentaries having to do with preparation of the land, with seed mixtures, and with soils. We offer these additional remarks, exactly as did he, in the form of afterthoughts.

THE MAIN SOIL TYPES on this farm are Durham and Appling sandy loams, with mostly yellow subsoil. A survey made by the Soil Conservation Service showed that about 50 percent of the original top-soil had been washed away.

The herd consists of registered Guernseys. It was for their maintenance that the land-improving program was started. The herd has been very closely bred for over 60 years and it was imperative that it get optimum feeding conditions to maintain production and insure the vigor of offspring. Good livestock can never be developed on depleted soil. No matter what the inherited ability, livestock cannot function unless properly nourished.

Our system of breeding from our own herd has enabled us to maintain animals free from disease, and from known producing ancestry. No replacements have been bought since the original foundation stock came from New Jersey in 1910. On the other hand, we have been able to supply foundation herd material all over the Southern States. This is in contrast to the average dairy farm in the State of Virginia, which each year buys a large percentage of its cows for replacement purposes. This is a great economic loss. Our dairy farmers ought not only to raise all their own replacements, but also have well-bred cows to sell to the 46,000 farmers in Virginia who do not even have a family cow.

The old cornfields that were sowed in lespedeza were topdressed with limestone, manure, and 20-percent superphosphate. The bluegrass was not sowed; it just came of its own accord. Parts of the pastures were disked in spring or fall, after getting 4 tons of ground limestone over a period 3 to 4 years, and from 1,000 to 1,500 pounds of 20-percent superphosphate during the same period. These areas were seeded with a mixture that contained about 10 pounds of Korean lespedeza, 5 pounds of orchard grass, 2½ pounds of herdsgrass, 2½ pounds of red clover, and 1 pound of Dixie white clover. This was rolled in and then topdressed with manure, taking care not to topdress after the seed had sprouted uutil it had taken good root. The disking cut the broomstraw up but did not eliminate it. The fields were mowed once or twice a year, and the heavy trashy hay on the bottoms was used for bedding. The best hay was fed out of stacks, while the growth on the poorest land was left for mulch. Most of the material mowed off pastures that had much grazing was left on the land as mulch. This should be done to assist the growth of bluegrass and help to absorb the water.

Excellent stands of alfalfa have been obtained by disking land that has been topdressed with limestone, manure, fertilizer containing 12 percent phosphoric acid, 12 percent potash, and 40 pounds borax to the ton. On land that has not been in alfalfa we used a mixture of clovers and grasses with 10 to 12 pounds of inoculated alfalfa seed. On a small field seeded in August 1942 the best results were on gullies that had been filled up with dirt dug out to make a fish pond. Previous to being disked this land was in broomstraw waist high and had not been plowed for over 80 years. The alfalfa, clovers, and grasses are not expected to last long but when they show signs of dying out the land will be seeded with Korean lespedeza and lespedeza sericia broadcast late in February, with no preparation other

(*Continued on page 45*)

LOOKING FORWARD TO A BETTER WORLD

BY R. M. EVANS

ONE OF THE REMARKABLE things about the recent United Nations Conference on Food and Agriculture, it seems to me, is that it studied the agricultural problems of the world. There have been many conferences in the past, attended by representatives from a great number of countries, to study financial or business problems but this is the first time a conference of this magnitude has been convened solely for the purpose of looking at the problems of agriculture.

Another remarkable thing about the United Nations Conference on Food and Agriculture was its sheer size. There were delegates from 44 countries. That gives some indication of the seriousness with which farmers in all parts of the world are thinking about their business.

The third remarkable thing—and maybe this is the most remarkable of all—was the evident desire of these people from all over the earth to cooperate with one another for the best interests of all. They not only were cooperating at the conference, they were looking forward to a better world after this war is won.

EDITOR'S NOTE.—The author, former head of the Agricultural Adjustment Administration, is member of the Board of Governors of the Federal Reserve System, Washington, D. C.

I THINK most American farmers would be interested in the food problems people are facing in some of the war-torn countries. After talking with the delegates from Great Britain, for example, I came to appreciate more than ever how important food is in the prosecution of the war. Food produced by our farmers has enabled the British to give their workers in the war industries a better diet than otherwise would have been possible, and this in turn has enabled them to increase their production of war materials very greatly. This is a war of machines in which an army without plenty of tanks and planes and guns is helpless. If, as a result of our supplying Great Britain with extra foods, they can step up their production of planes, it means that there are just so many more planes available for instant service—planes that do not have to be manufactured in this country and transported across the sea.

In China and many of the other occupied countries the need for food enough to keep body and soul in the same suit of clothes is critically urgent. Lack of food has handicapped their war effort, and it will also handicap their post-war reconstruction because the Chinese people may not be strong enough physically to do all the work that needs to be done.

In Russia farmlands have been devastated in huge areas—buildings have been burned, tractors and farm machinery stolen and taken away, and even men and women who formerly tilled the soil have been removed to Germany to work in Nazi war industries. Russia, in the post-war period, will have a tremendous task just to restore the ravaged farmlands and get back into food production.

THE INTERESTS OF CONSUMERS bulked large in the thinking of the delegates to the Hot Springs conference. Consumers are the customers of agriculture. We all, of course, want them to be supplied with an abundance of food of good quality at reasonable prices. In the period after the war there is going to be a scramble for food of any kind. The production schedule will call for farmers growing cereals and other products that can be utilized quickly as food, rather than concentrating on the rebuilding of herds and flocks. The latter is the long-time objective, however, and nations will move in that direction as soon as immediate needs have been filled.

There was a feeling among the delegates that some way must be found for nations to assume more responsibility in providing children with a well-balanced diet so that they can grow up into physically and mentally well equipped citizens. Today scientists know a great deal more about nutrition than formerly, and I believe nations as a whole are taking a more enlightened view regarding the nutritional needs of their citizens. Certainly over the years ahead it will be in the best interests of every nation to keep healthy its people, especially young people and mothers. Ultimate advantages, due to increased

working capacity—and less sickness—should be very great. A healthy nation means less-crowded hospitals and less need to care for people at public expense.

I FIND THAT MANY of the farmers abroad are worrying about some of the same problems that plague us in this country. They realize their soil is being depleted because of the heavy drain due to intensive cultivation for the war, and they know it must be rebuilt if it is to produce rewardingly. They are thinking more and more about soil conservation measures, and they are generally agreed that the farmers of the world should exchange knowledge and experience with one another. Probably some countries will want to exchange trained experts, especially those who have had broad experience with soil conservation. Our farmers will thus derive benefits from conservation ideas developed outside this country. Undoubtedly much is to be gained by this kind of mutual help.

I think the greatest cause for concern among our farmers is expressed by the question: What are our markets going to be after the immediate needs of war-torn nations have been met in the post-war period? And, especially, what are these markets going to be for the crops that are produced in surplus in this country? We have been in the habit of exporting a fair percentage of our agricultural production in normal years, and we are interested in seeing that world markets remain open.

Farmers in other parts of the world have similar problems with some of their crops. I think it likely that these countries will try to work out programs similar to that of the International Wheat Agreement, which attempts to assure consumers an adequate supply at all times and still give producers a reasonable return for their labor and investment. This is something worth working for, and we must all work together to do the job which I think must be done. No nation can do it alone.

LOOKING AT THE CONFERENCE strictly from the standpoint of the American farmer, it seems to me it sets a pattern from which we have much to gain. Certainly we can agree that the land should be farmed in such a way as to build up fertility and so maintain productivity at a high level. Certainly we can agree that it is good farming to increase the production of poultry, dairy, and meat products, provided we can have markets that will consume them.

One of the best markets for these and other products in this country is going to be that created by giving all groups an adequate, well-balanced diet, and raising living standards so more people can have the clothing and the scores of other things needed to make a better life. Now that employment is at a very high level and the income of all the people is relatively high, we find that their ability to consume our increased production of meat, poultry, dairy products, and other agricultural crops is very greatly expanded. If we could have full employment in the post-war period we would have the greatest market we have ever had for the products that naturally result from a sound soil conservation type of farming—greater even than it is in this wartime period.

OBVIOUSLY, BOTH THE EMPLOYMENT and the health of the peoples of the different nations depend on the soil. Bodies are really built from the ground up; therefore, in planning a food program for the nation and for the world, proper attention must be paid to improving and safeguarding the soil which, after all, is the source of our food. Appropriate soil conservation practices not only save the topsoil but insure immediate and continuing increases in crop yields.

I am assured, for example, that in the Estencia Valley of New Mexico, where rainfall is limited, contour farming supported by terraces produced 47.3 percent more beans for a 4-year period, 1936 to 1939,

The oat yield on the untreated *topsoil*, at left, was four times that on the untreated *subsoil*.

than did similar fields that were unterraced and farmed in straight rows.

Similarly, the yields of wheat on nearly 200 fields in the Southern Great Plains were 31.3 percent greater where the land was terraced and contoured.

Corn on contour listed land for a 6-year period at Clarinda, Iowa, averaged 12 bushels more per acre than adjacent land that was listed up and down the slope. In 1941 the yield of corn on half of 19 rolling Iowa fields that were contour farmed averaged 11.3 bushels more per acre than on the other half of the same fields where contour farming was not practiced. Last year (1942) was a good corn year and rainfall in Iowa was thought to be ample, yet the average yield of corn for 30 contoured fields was 6.2 bushels per acre greater than the yield on the noncontoured portion of the same fields. The yield of soybeans for 30 contoured fields in Iowa last year averaged 3.3 bushels greater where the land was contour farmed.

Extensive experiments throughout the Corn Belt show that corn grown in a good rotation, including a legume, can be expected to yield at least 25 percent more than where corn is kept on the land year after year. In the Southeast, the increased yield of corn or cotton grown in a good rotation can be expected to be from 50 to 100 percent more than when either crop is grown continuously.

Data on crop yields in the Northeast indicate that the practice of crop rotations in connection with the production of truck crops will increase the yields from one-fifth to one-third.

The use of commercial fertilizers and manure in conjunction with good crop rotations at widely different locations in the United States has produced increased crop yields ranging from 10 percent to 400 percent. In some areas the effectiveness of fertilizers and manure is limited by lack of sufficient moisture, but in various other localities results indicate that an average of at least 20 percent increase in yield can be expected from application of adaptable fertilizers.

The data all show that best results are to be obtained by adopting soil-conservation farming before the fertile topsoil is washed away. In the absence of soil-conservation farming, a good many fields may lose topsoil at the rate of an inch in 1 to 5 years. It has been shown that corn, soybeans and other cultivated crops yield in proportion to the depth of the topsoil that remains. For the Corn Belt it has been shown that on some important types of farm land a decline of 5 bushels of corn per acre occurs for each inch of topsoil that is lost.

I think it is comforting for the American farmer to realize that business and industry are giving markets and soil conservation and nutrition most careful attention, and that their leaders are working together to bring about conditions that will insure full employment in the post-war world. The same idea came up again and again at this conference—only it was on a world scale instead of simply a national scale. Certainly agriculture and people generally have a great deal to gain if this movement is successful in our country and in other countries.

I am encouraged to believe that this conference will result in a permanent world organization devoted to bringing about a sound, conservation type of farming and ever-expanding markets for the products of such farming through improved nutrition and higher levels of living in all countries. The farm programs we have spent so many years in developing will naturally fit into this general pattern, and they will continue in the future as they have in the past to give the American farmer his fair share of an expanded national income.

BETTER SEED OR BETTER SOIL

BY W. A. ALBRECHT

Figure 1.—The bluegrass stand improved according to the lime delivered to it by the soil, notwithstanding plenty of all other nutrients. (White sand top dressing was used to facilitate photographing.)

THE SIZE of the harvest is the measure of the productive capacity of the soil. Such capacity can be no larger than that permitted by the soil fertility. But harvest time is already too late to help the yield of that crop revealing the deficiencies that were a handicap during its growth, or even in the earlier process of germination. That shortages in soil fertility or in plant nutrients in the soil—particularly of lime or calcium—should show up in the very beginning of the plant's life, and should be responsible for poor germination and defective stand even in grass crops is not widely appreciated.

Grass seedings may be costly through wastage of seed and loss of stand, according to some work by Dr. E. R. Graham at the College of Agriculture of the University of Missouri. By using three different lots of soil that had been carefully prepared to deliver three different amounts of calcium or lime, he demonstrated a heavier stand of bluegrass from the

EDITOR'S NOTE.—The author is chairman of the Department of Soils, University of Missouri.

same rate of seeding as the soil supplied the embryo plants with more life. This is illustrated in figure 1.

These soils, in all three pans, had been provided with the same amount of all fertility needs other than lime when they had first been planted to soybeans. The entire bean crop, roots and tops, had been analyzed. In this way the lime delivery from soil to crop was measured. Pan No. 1 supplied 16 units of lime to the soybeans; pan No. 2 provided them with 42; and the third pan with 112. These figures represent the lime this legume obtained from these soils to make the differences in growth shown in figure 2.

We have commonly blamed the lime shortage in the soil, or soil sourness, for poor stands of legumes. We have been liming to keep from wasting costly legume seeds. When 8 pounds of clover seed, at $9 a bushel, are thrown away in stand failure, to mean the loss of $1.20 per acre, we do not appreciate the fact that this would need to occur but twice to pay for liming that failing acre with almost 2 tons of limestone. It need occur only once to cover the cost of drilling about a half-ton of limestone per acre as one drills fertilizers. Lime put into the soil in late winter in this manner can do much to supply the calcium needed to improve germination, to thicken the common stand, and to get the crop off to a good start. Grasses, as well as legumes, are now demonstrating the same possibility.

That it doesn't take much lime within the plants to make the crop difference can be judged from the soybeans in figure 2. A ton of crop No. 1 would take from the soil the equivalent of 80 pounds of limestone. It takes only about two-thirds more limestone inside the crop to duplicate No. 2. By making sure that the crop can get about three times as much limestone out of the soil per ton of this forage we can get a crop like No. 3. Fifty percent more tonnage per acre in No. 2, and over 115 percent more crop yield in No. 3 are the results of giving the soybean a chance at no more than 300 pounds of limestone put into the crop. This happened because of the lime, and not because of the liberal but constant amount of other fertilizers.

Perhaps we shall eventually believe that liming the soil is more a matter of giving the crop its calcium than one of fighting soil acidity. When we do, we shall not only use the limestone broadcast in heavy dosage to cover our neglect of the soil during the past, but we shall drill limestone regularly to meet the recurring needs, as we do any other fertilizer.

Bluegrass seedings are already here with their sad tales of stand failures. When these more numerous crop failures with reduced seed production shove seed prices up, as clover failures have done, then we will either lime the soil, or search for a substitute crop for bluegrass. By that time, however, we may have enough knowledge about the chemical composition of the crop, and enough appreciation of its variable value as animal feed, in terms of variable soil fertility producing it, that we will not accept the crop substitute, but will treat the soil instead.

Figure 2.—Soybean crops register the lime-delivering power of the soil and suggest the possible bluegrass stand to follow.

Dr. Graham's demonstration that a stand of bluegrass is in proportion to the lime delivery by the soil, in spite of the fact that all other nutrients were amply supplied, suggests that lime is the foundation on which to base the help by other fertilizers. He has called attention forcefully to the fact that if we are to use our investment in fertilizers and seed for good returns on soils like many of those in Missouri, we must make certain that those soils first have, and can deliver, the calcium needed by the crop. How much seed can be saved, and how much more profitable the use of fertilizers can be when the lime needs of the soil are supplied may be one of the revelations of the future. At present such attention to the soil bids fair to result in (*a*) stand improvement even in bluegrass, (*b*) tonnage increase in forage harvest, and (*c*) greater feeding value of crops that must be garnished through the help of animal machinery and converted into cash via the milk pail or the butcher block.

PLOWLESS FARMING

(*Continued from page 41*)

than another topdressing with limestone, manure, and alfalfa fertilizer. This field is far from the farms and not in the regular alfalfa setup.

Our gross income is over $300 a year per cow, but when we quit growing corn many farmers said that we had quit farming. We had to quit or our farm would have joined the Navy in Hampton Roads!

CHIEF BROADCASTS TO SOUTH AFRICA

RESPONDING to an invitation from the Overseas Branch of the Office of War Information, Dr. Hugh H. Bennett, Chief of the Soil Conservation Service, has recorded five talks on soil conservation for short waving to South African farmers.

Soil conservation is one of the timeliest and most important subjects in the world to South African farmers, OWI reports, and vigorous and progressive measures are under way there to combat erosion. It was Prime Minister Jan Christian Smuts of the Union of South Africa who declared not long ago that "erosion is the biggest problem confronting the country, bigger than any politics."

In his talks, Dr. Bennett pointed out many parallels in erosion-control practices in the United States and South Africa. He paid his respects to Colin Maher, Kenya Colony conservationist, who visited the United States several years ago to study soil-conservation methods and later write an extensive report on his observations. In addition to pointing out the scarcity of productive land in the world and the need of conserving what we have, Dr. Bennett stressed the importance of soil conservation as a factor in international good will and understanding. "It will lead in the direction of world peace probably more than any other activity of mankind," he said.

Other highlights of the South African talks follow:

Only about 11 percent of the earth's total land area, whether it be in the hands of our enemies or our friends, is capable of cultivation now or in the immediate future. This relatively small fragment of earth is all the human family can draw upon. At present, the other 89 percent cannot furnish man with the necessities of life . . . Today the world faces a scarcity of productive soil. Some 2 billion people depend for sustenance on only 4 billion acres.

Our best estimates of the land situation indicate that from two-thirds to three-fourths of world's available croplands are subject to erosion. Of this, at least two-thirds already has been damaged because of such wasteful practices as up-and-down hill farming, continuous use of soil for a single exhausting crop, or cultivation of steep land that should be used only for grass or trees.

Conservation farming is the equivalent of finding new cropland. Every five farms where conservation is completely installed are now producing the normal output of six untreated farms. Efficiency in farming means not only the elimination of waste but expansion of producing capacity.

The total cropland now available to the existing world population is barely enough to supply a minimum diet. It is not enough to provide an adequate diet.

Soil conservation is not the private concern of any one nation nor of any one group of people. Soil conservation is the concern of all nations, and of every citizen in every country. The future of all nations, in the last analysis, depends on how we use and care for the croplands of the world . . .

Soil conservation is not a passive science, something that is to be applied only when there are signs of danger. For then it is too late. Soil conservation must be an ever-watchful sentry responsible for the safety of the source of food production for the world, now and for all time.

Soil conservation becomes the basic link between nations for the betterment of people as a whole. It is a constructive force for binding together land users within community areas, and for building international good will and understanding. It will lead in the direction of world peace probably more than any other activity of mankind. We might very well recall this, then, when we come to reflect upon the fact that now, 1,943 years after the birth of Christ, we have on our hands the most terrible of all the long history of wars. Something has failed somewhere. It may be that our costly failures across the centuries might have been avoided or minimized through international cooperation in matters pertaining to that kind of good land use which produces more food for people everywhere.

I wish it were possible for us to compare notes occasionally on the work we are doing. An exchange of ideas is always helpful, especially, from nation to nation. Soil conservation may yet become one of the best unifying bridges between nations of the world. The conservation programs of South Africa and the United States are typical of work that strengthens international friendships and brings closer the day of real and lasting peace.

—Emil Corwin.

WAYSIDE TEACHING

J. C. Owens, work unit leader in the Limestone Valley soil conservation district in Georgia, believes in adapting educational meetings to the situation.

One day during the late winter when it was raining, he was passing a crossroads store and stopped in to buy a package of cigarettes. He found the owner of the store and several farmers discussing the AAA program and soil-conservation practices, and he joined in the conversation.

Mr. Owens had a projector and some slides in his pick-up and he asked permission of the owner of the store to show the slides in order to illustrate methods of establishing the practices they were discussing. With the rain pattering down and no prospect of getting any work done anyhow, all agreed this was an excellent idea.

Mr. Owens spent an hour and a half showing the slides and discussing the various practices with the farmers. As a result of the discussion, six of the eight farmers present made application to the district for assistance in developing conservation plans for their farms.

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For REFERENCE

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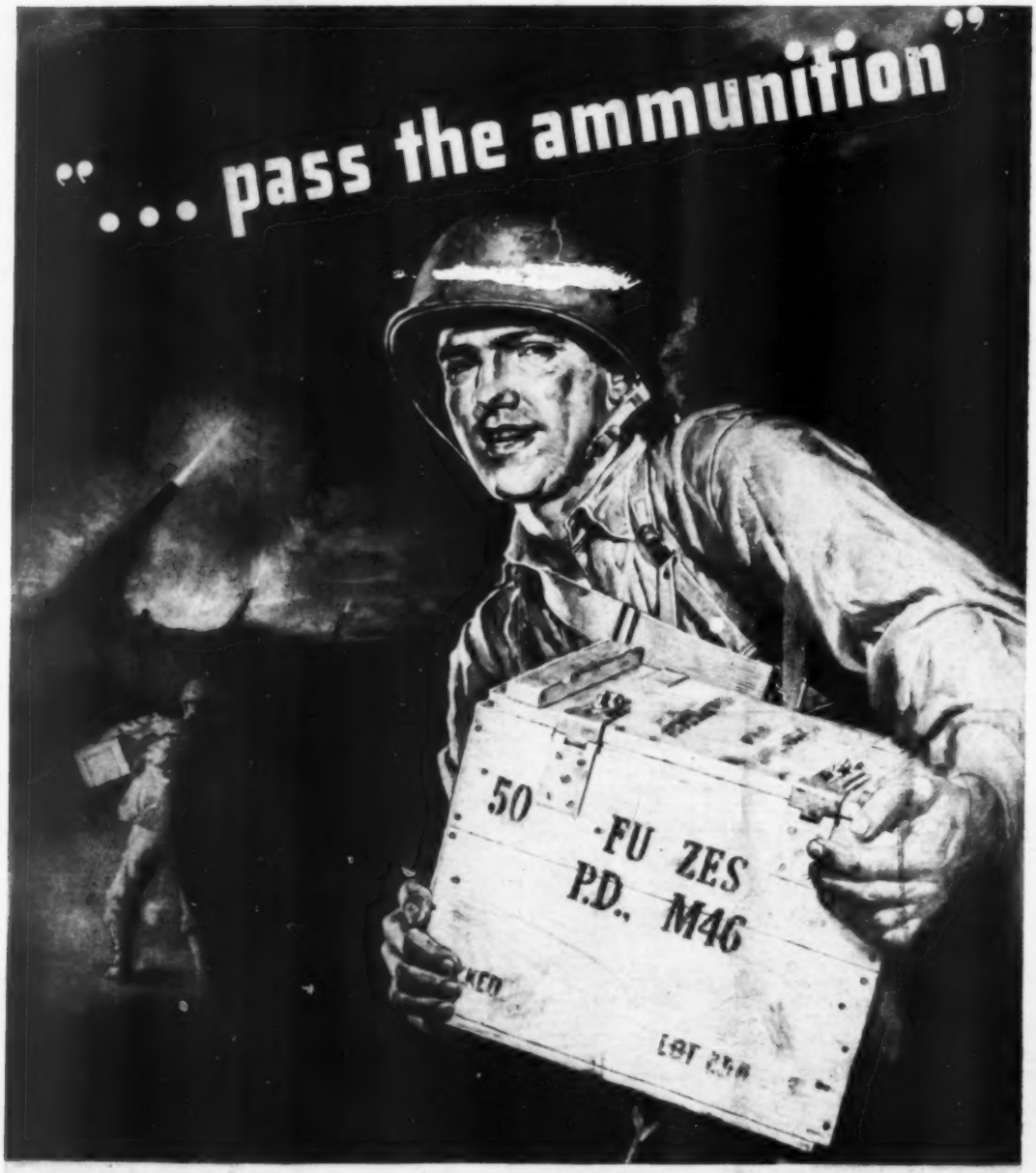

THE ARMY NEEDS MORE

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DETROIT

This war poster of timely appeal brings to focus the great importance of farm-woods production stressed by A. E. Fivaz in his article in this issue.